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PREFACE.

From the following summary of the contents of the Volume, with which it has been customary to occupy the Preface, the reader will discover that, besides those inventions and meritorious exertions for which the Society have conferred their rewards, there are several unmarked by this distinction. It is necessary for the Committee, to whom is intrusted the publication of the Transactions, to say a few words in explanation of this circumstance. The object of the Society is to communicate to the public all the new and useful information which they can procure on subjects connected with the arts, manufactures, and commerce of the country; and they have always been ready to bestow their medals and pecuniary rewards, for the purpose of inducing ingenious persons to offer to the Society, and, through the Society, to the public, the practical results of their labours and experience. The only objection to this plan is, that it throws a difficulty in the way of those officers or members of the Society who would be inclined personally to interest themselves in procuring communications; since, by so doing, they might be thought to have laid themselves under an implied obligation to propose a reward, in compensation for a paper, the amount of which it might not be easy to adjust with satisfaction to the expectations of the candidate and the duty of the examining committee. In order to remove this obstruction to the zeal and activity of some of our most valuable members, the Society have resolved to receive, and to refer to their committees, not only papers offered in claim of reward, but also such as may be sent only to be read to the Society, and, if approved, to be inserted in the printed Transactions. Several of these appear in the present Volume, and add greatly to its value.

In the class of Agriculture, rewards have been voted for two draining-ploughs. To Mr. Green, the inventor of one, has been granted 15*l.*; and to Mr. Pearson, the inventor of the other, a similar sum of money and the large silver medal.

Every farmer knows, that land which is chilled by stagnant surface-water, or by springs that cannot find a free issue, can never make an adequate return for the labour and manure bestowed on it. The only remedy, in such cases, is to cut drains, so directed as to draw off the whole superfluous water. To effect this by trenching or spade labour is, at all times, expensive, exceeding often the means of the tenant, or the inclination of the landlord. In certain situations, where the injury arises from stagnant water lying on a tenacious clay, free from stones, a plough may be had recourse to, instead of spade labour, for cutting the drains. From this substitution will arise a great saving of expense, so as to render it practicable to drain, and bring into a state of profitable culture, land so situated as not to admit of the more costly method of trench draining.

Mr. Green's plough, at three successive cuts, will form an open trench eighteen inches deep, half an inch wide at bottom, and five inches wide at top; and the experiments that have been tried speak very favourably of its performance.

Mr. Pearson's plough, at three successive cuts, forms a trench twenty-six inches deep, an inch wide at bottom, and ten inches at top. It has been in use for some years by the inventor, who has effectually drained, by means of it, a farm occupied by him, at Frittenden, in the weald of Kent, to the great advantage of the land, and profit of the tenant.

The large gold medal has been voted to Joshua Kirby Trimmer, Esq. for his flock of pure merino sheep. About twenty years ago, the Cortes of Spain presented to the late King a number of select sheep, from their two most-esteemed flocks, the negrette and the paular. Shortly after, the oldest of the ewes being drafted for sale, Mr. Trimmer became the purchaser of eighty ewes and two rams, of the negrette variety. Having made this acquisition, and being desirous of preserving the breed in all its purity, Mr. Trimmer parted with all the other sheep that he then possessed, and ever since has kept none except the original negrette flock and their progeny. In consequence of the long continuance of war in every part of Spain, the negrette breed became wholly extinct in that country; and those English gentlemen who, like himself, became purchasers of drafts from the royal flock, and of that flock itself, when the farming establishment at Windsor was broken up, have mingled the negrette with other races of merinos, or of English sheep; so that Mr. Trimmer's flock is probably the only absolutely pure negrette breed at present existing. It now amounts to above 700 individuals. Mr. Trimmer's original negrettes were very unsightly, having, for the most part, large dewlaps, and a general looseness of skin over the whole body; the fleeces, even of the best individuals, were very unequal, and the wool was generally much coarser on the hinder parts of the animal. Mr. Trimmer's first aim was to increase the length of the wool, and at the same time to improve its fineness; and by long-continued and strict attention, he has succeeded in both these points: the coarser parts of the fleece have gradually become finer; so that, in many of his sheep, there is scarcely any difference in the wool grown on different parts of the body.

While these improvements of the wool have been going on, the original looseness of the skin has been rectified, the pendulous dewlap has been worn out, the carcass has become more spread, more apt to fatten, and the flesh has the qualities and fetches the price of the best mutton. In proof of the quality of the wool grown by Mr. Trimmer, it is only necessary to state, that for the two last years it has been sold at 3*s*. 6*d*. per pound.

Richard Yates, Esq. has communicated an interesting notice respecting the plantations which, of late years, have been formed on the shore of the Mersey, east of the town of Liverpool.

In the class of Polite Arts, the large silver medal was voted to Dr. Dowler, for a musical instrument, called by him the Glossophone. A short time ago was invented a little pocket instrument, generally known by the name of Eola, consisting of metallic tongues, or springs, set in a small frame, which, when impelled by the breath, were brought into a state of vibration, and produced musical tones of surprising fulness and clearness. Taking this invention for his basis, Dr. Dowler has adapted to it the organ mechanism. A wind box, with which a pair of bellows communicates, is divided into as many partitions as there are tones and semitones; a spring is laid over each partition; and a valve, capable of being raised or depressed by its key, permits or prevents the passage of air from each partition. The instrument has a compass of four octaves, occupies but a small space, is not necessarily expensive, and will probably be found a welcome addition to our present stock of musical instruments.

The gold Isis medal was presented to Mr. Robertson, for his improved method of executing paintings in water-colours. By a combination of processes, some original, others already known to a few artists, he has succeeded in giving to his pictures a purity of tint, and a strength and solidity of colour, which renders them almost a perfect representation of paintings in oil. A specimen was exhibited to the Society, which has been executed several years, and has been cleaned, when dirty, by means of spirit of wine; and neither by time, nor by the use of this menstruum, have the colours been at all impaired.

The premium of 20*l.*, for an improved method of executing lithographic transfers, was awarded to Mr. Netherclift. The art of lithography, as first practised, consisted in drawing or writing, with a peculiar kind of ink, on prepared paper, and then transferring the design or characters to a smooth surface of stone, from which, by means of printers' ink, impressions were taken on common paper. The presumed advantage of this mode of proceeding, independently of its economy and convenience, was, that the impressions were actual transcripts of the original design, exhibiting all those characteristic touches so highly valued by the professional artist, but which are, for the most part, lost in the translation (so to speak) of the engraver. It was, however, soon discovered that the defectiveness of the lithographic ink, and of the size by which the paper was covered previous to its receiving the design of the artist, as well as of various other parts of the manipulation, greatly detracted from the certainty of the process, and from the perfection of the result. The consequence was, that the artist was obliged to make his design on the stone itself; and the method of transferring was retained only for written characters. Under these circumstances, the Society offered a premium for any improvements in this branch of art, which should render the process of transfer from the paper to the stone applicable to drawings as well as to writing. Mr. Netherclift became a claimant, and exhibited before the Society specimens of transferred drawings, which, if not of the highest quality, are at least greatly superior, in the fineness and clearness of the lines, to any specimens heretofore produced. The particulars of Mr. Netherclift's process are contained in the present Volume, and, when practised by regular artists, will, no doubt, afford results fully justifying the expectations of the Society.

To Mr. Kelsall the Society are indebted for a very satisfactory account of a method of taking casts of medals in plaster of Paris.

In the class of Chemistry, the sum of 20*l.* was granted to Mr. C. S. Smith, for his improved melting-pots for iron and steel. In composition, these pots do not, perhaps, materially differ from those made by Mr. Anstey, and for which, two years ago, he received the Society's reward; but, in standing a high and long-continued heat, under the pressure of seventy or eighty pounds of melted metal, without giving way, the pots made by Mr. Smith appear, from comparative trials, to be superior to all others. The details, both of the ingredients and of their manipulation, as published by the Society, will, it is hoped, contribute essentially to the improvement of an article in very extensive use, not only by a large class of artists in London, but also at Birmingham, Sheffield, and other places where the manufacture of hardware is carried on.

The large silver medal was voted to Mr. Carey, of the Navy, for his method of preventing rottenness in ship-timber.

It had been long known, that the vessels employed in the Newfoundland fishery, which take out their salt in bulk, and bring back their cargo of salted fish also in bulk, are not liable to destruction by rot. From the nature of their cargo, and the method in which it is stowed, the timbers of these vessels must be saturated with fish-oil and salt. Arguing from this notorious fact, Mr. Carey, being employed, in the year 1786, to build a schooner in the Gulf of Canso, in Cape Breton, of timber green from the woods, mixed together a quantity of salt and fish-oil and pounded charcoal, with which he filled up the spaces between the timbers, inserting here and there stops of wood to keep the composition in its place. Thirty years afterwards, namely, in 1816, Mr. Carey, being at New York, met with the owner of the schooner, then lying in that harbour, was allowed to examine her, and found no appearance of decay in any part. Since that time Mr. Carey has not heard any thing of the vessel; and advertisements, inserted in the New York and Boston newspapers, both by Mr. Carey and at the instance of the Society, have failed to procure any information either respecting the vessel or its owner. The Society have no reason to suspect the truth of Mr. Carey's statement; but not having been able, with all their endeavours, to procure a corroboration of it, are compelled, however reluctantly, to reward with their silver medal a communication on which they would have been much better pleased to have found themselves justified in bestowing the very highest reward in their power. The importance of the subject is immense, both to the public and private shipping of the country; and they trust that their publication of Mr. Carey's process will induce a trial of it by some of our ship-owners.

Dr. Bostock has furnished a paper, containing the results of his chemical examination of the materials that enter into the composition of writing-ink, together with the practical deductions therefrom. The Secretary has communicated some observations on the domestic manufacture of wine from raisins: and a sample of bone-glue, prepared by Mr. Macqueen, has given occasion to some comparative experiments between the glue from bones and that from skin, in which the greater fluidity of the former at a temperature approaching to boiling has been ascertained, as well as the practical advantage to be derived from this property in particular circumstances.

In the class of Mechanics, rewards have been granted for several inventions by seamen, either in the naval or merchant service, having for their object nautical improvements. The occupation of a sailor constitutes, as it were, a world of itself; and it is hardly possible for any one who is not practically acquainted with its details, to suggest, with any reasonable hope of success, even the simplest and most plausible changes. The instability of the element which the seaman inhabits, and the fickleness of that other element whence he derives his locomotive power, are necessary and essential conditions affecting every action which he performs, as well as the means or machinery which he employs, but of which no landsman can form a correct idea.

To communications from practical seamen on their own subjects, the Society always turn an indulgent ear: and of those inserted in the present Volume the greater part will, it is hoped, be found to be valuable contributions to a department of active industry inseparably connected with the power and prosperity of the country.

The silver Isis medal has been awarded to Lieut. W. Pringle Green, R.N., for his method of working a rudder, the head of which has been carried away either in action or by any other accident. On the broad part of the rudder, but above water, he fixes an iron yoke with two arms, from which proceed ropes through the nearest opposite ports to the steering-wheel.

The plan has been submitted to the Navy Board, who ordered Lieut. Green to fit a yoke for trial on board a frigate that has recently sailed on foreign service.

The gold Isis medal has been voted to Lieut. Rodger, R.N., for his syphon for watering ships. At present, ships of war and Indiamen stow the greater part of their water, not in wooden casks, as was formerly the case, but in iron tanks. This change has superinduced another, of attaching to the naval service at our principal ports, both at home and abroad, a tank vessel for the supply of water to ships of war. The entire hold of such vessel is converted into a tank, which being filled with water, the vessel is brought alongside the ship to be supplied, and the water is then transferred by means of pumps. The expenditure of time and the loss of water in this operation are considerable; and the fatigue of the men employed on such service in tropical climates is very hazardous to their health. Lieut. Rodger has contrived a syphon, attached to the tank vessel, by means of which the water is transshipped more expeditiously, without the least fatigue on the part of the men, and almost without loss from spilling. Of course, no novelty can be expected in the principle of action of the syphon, or in its construction as far as the principle is concerned; but many minor adjustments, very essential in its application to this particular object, have been introduced by the inventor.

To the same ingenious officer the large silver medal of the Society has been voted for a make-shift anchor. By this term is understood, in a ship-of-war, any heavy article, generally a gun or the anvil, employed as an anchor when the others have either been lost, or, from particular circumstances, cannot be got out. It is obvious that the resistance of a gun or anvil in such a situation is little else than its weight, as it can take no hold of the ground over which it is dragged, and is therefore likely only to retard the drifting of the ship, instead of bringing her up. The happy idea occurred to Lieutenant Rodger, that if six pigs of ballast were made to terminate at one end in an oblique wedge, and if they were, at the same time, pierced with two transverse holes to enable them to be bolted together, two of the pigs being likewise cast each with an eye for the reception of a shackle to attach the cable to, there would thus be materials at hand for the construction of an anchor in case of emergency, capable of being put together in a few minutes, and in form bearing a close resemblance to the mooring-blocks laid down in Portsmouth harbour, which bed themselves deeply, and almost immovably, in the mud. An anchor of this construction was put together and tried on board a frigate, and was found to answer to admiration. In two very important qualities, namely, in not being liable to be broken, and in being capable of being slung under a boat's keel while carrying out, it is manifestly superior to the common anchor, of which the numerous essential defects are now very seriously attracting the notice of naval officers.

The gold Isis medal has been voted to Mr. Reynolds, for his repeating-stop for a naval sextant. When an observation, either by day or night, has been made with the common naval sextant, such observation must be read off and registered before a second observation can be made; hence results a loss of time; and not unfrequently, an opportunity of making the necessary number of observations to determine the ship's position is, in cloudy weather, entirely lost. Mr. Reynolds, by adapting to the common sextant two small brass slides, each with four bolts, is enabled to take five observations in succession (each bolt registering an observation), without the necessity of reading them off intermediately. The most satisfactory testimonials, by naval officers and others, respecting the high importance of this addition to the sextant, and that it does not in the least interfere with the accuracy of the observations, accompany Mr. Reynolds's communication, and justify the reward bestowed by the Society on the invention.

To Lieutenant Williams, R.N., the large silver medal has been presented, for his ingenious manner of so coupling a pair of oars as to render them capable of being worked by a person who has only one hand. Lieut. Williams himself, by the chances of the naval service, has been reduced to this condition; and an invention, to which he was probably at first stimulated by no other motive than a desire of enjoying independently a favourite amusement and exercise, has appeared to him worthy of being laid before the Society, as offering to many similarly disabled seamen a means of earning a subsistence as ferrymen.

Commander Pearse, R.N., has furnished a paper, containing directions for cutting the jib-sails of cutters with greater precision than has hitherto been generally practised: and J. Hall, Esq., Secretary to the St. Catherine Docks, has sent a short but very useful suggestion for an improved method of mooring vessels in the Thames, whereby space is gained, and free access at the same time obtained, to every ship in the tier.

Large silver medals were presented to Mr. Mordan and to Mr. Clement, for their respective improvements connected with the turning-lathe. Of all modern instruments, the turning-lathe, in its various modifications, is the most generally useful, and is in a state now approaching to perfection. Mr. Mordan has supplied a deficiency which still remained, arising from the difficulty of chucking small cylinders so as to make them truly centrical: this he has done by the invention of a very simple and effectual self-centering chuck, for the description of which the reader is referred to the body of the Volume.

Mr. Clement, by his self-adjusting double driver, has found the means of removing a certain degree of eccentricity, and, therefore, of imperfection, which necessarily occurs in the figure of any long cylinder suspended between the centres of the lathe, and made to revolve by the action of a single driver. Under these circumstances the pressure of the tool tends to force the work out, and to distribute the strain between the driver and the adjacent centre, so that one end of the cylinder becomes eccentric with respect to the other. This imperfection is now removed by Mr. Clement's two-armed driver, which is also self-adjusting: by means of this, all strain is taken from the centre and divided between the two arms; and these latter being equidistant from the centre, no eccentricity in the work turned can possibly occur.

To Mr. Hilton the large silver medal was given, for his pump for racking wine. The candidate is himself a wine-merchant, and, like others in the same business, experienced the injury sustained by delicate, high-flavoured wines when racked in the usual manner, by which they are greatly exposed to the action of the air, as well as the difficulty attending the performance of this necessary operation in cellars where the casks are crowded one upon another. In order to avoid this injury and inconvenience, he employs a pump, ingeniously contrived to prevent either regurgitation or any variation in the rate at which the wine flows from the full cask, while, at the same time, the mixture of air with the liquor is almost entirely avoided.

The large silver medal of the Society has been voted to Mr. Davies for his fire-escape. Among the casualties of this great metropolis, the loss of life by fire is one which, although comparatively of rare occurrence, excites, perhaps more powerfully than any other, the sympathy of the public. Numerous are the communications every year submitted to the Society on the means of preventing this calamity; but it is probable that nothing effectual will be done, except the ingenuity of individuals shall be seconded by a system of parochial police directed to this object. It is evident, that in most cases of this description, relief, if obtained at all, must come from without. The persons in hazard are seldom possessed of sufficient presence of mind to apply the means of escape that may be in their power; and, in most instances, the time from the commencement of the alarm to the latest period in which relief is possible, hardly exceeds a quarter of an hour. Whatever is to be done, therefore, must be done quickly: no time can be lost in yoking horses for the conveyance of cumbrous machines, but the means must be at hand, in the nearest watch-house, constantly ready for use, and of the utmost simplicity in construction and of facility in application. Mr. Davies's apparatus, perhaps, combines all these essentials in a more practical degree than has yet been offered to the public. It consists of a hook, fixed to the middle of a doubled rope, for the purpose of securing it to a bed-post, or any other support that may be at hand, and of a number of slings, each capable of conveying one person. These slings run by a ring on the rope, and the rate of descent is regulated by the divergency of the two ends of the rope, managed by persons in the street below. The possibility of thus descending in safety from an upper window was demonstrated by an experiment made at the Society's house; and if in actual use it should be found to be efficacious, no persons will more rejoice than those through whom it is now offered to public notice.

To Mr. Cuthbert, a mathematical and optical instrument maker of considerable eminence, were awarded the large silver medal and twenty pounds, for his improved stand for telescopes.

In the portable astronomical telescopes, as usually mounted, the small attached telescope, or finder, as it is called, is directed to the star to be observed, by means of a toothed wheel acting in rack-work: this rough adjustment being obtained, the rack-work of the finder is to be secured before that which directs the telescope itself to the object can be worked. If this, from inadvertence, should be omitted, the teeth of the first rack-work are very liable to be broken. Mr. Cuthbert has avoided this hazard, and has, at the same time, simplified the apparatus and rendered it cheaper, by substituting for the rack-work of the finder a very simple friction movement, like that of the hands of a watch, incapable of being put out of order, and quite independent of the vertical and horizontal racked wheels by which the movements of the telescope itself are performed. The invention, besides avoiding the inconveniences above mentioned, has also an advantage in point of expedition, which adds much to its utility.

The silver Isis medal and the sum of five pounds were voted to Mr. Parvin for his improved French window. Those windows that are made with folding sashes coming down to the floor are commonly called French: they serve the purpose both of a window and of a door, and are often used to give ready access to a balcony, or, on a ground floor, to allow of egress to a garden or lawn. The chief inconvenience attending their use is, that they do not shut so accurately as English notions of comfort require; and in particular, when on a ground floor, that they do not sufficiently prevent the rain from driving in beneath them. To remedy this latter defect has been the aim of Mr. Parvin's ingenuity. The very act of closing the window raises a low flap, attached by ring hinges to the sill, which completely obstructs the entrance of rain. The contrivance has already, in a few cases, been reduced to practice, and has been attended with the success anticipated by the inventor.

The silver Isis medal has been voted to Mr. Tindall for a wheel with a movable axle, the object of which is to give greater facility to it in turning: and the sum of five pounds has been voted to Mr. Aust, for his application of a copper or brass lining to a leaden pump barrel, in order to increase its durability.

In addition to the above, Mr. Smart has furnished a description of his apparatus for making casks; Mr. Bramah, of the application of his hydro-mechanical press to a horizontal oil-mill; Mr. James Jones, of his method of making taps and dies for screws of large size; Mr. Theodore Jones, of his wrench for round-headed screws; Mr. Varley, of the method employed by his late uncle, Mr. Samuel Varley, of hammering and condensing brass for the use of clock-makers; and Mr. Robison, of his apparatus for filtering oil.

In the class of Manufactures, the sum of five pounds has been presented to Mr. Roberts for an improvement in the loom for weaving velvet, which, by introducing a more regular pressure, tends to give a more even face to the cloth,—a character on which much of its beauty depends.

To Mr. Hughes have been awarded the silver Isis medal and fifteen pounds, for his improved cards for weavers of figured silks. It is wholly impossible by words to give an idea of this improvement to those who are unacquainted with the mechanism of the Jacquard or Lyonese silk loom; the effect of it, however, is a saving of considerable amount in the expense of the cards, —an advantage which, in the present state of the manufacture, will, no doubt, be duly appreciated by those whom it concerns.

In the class of Colonies and Trade, the large gold medal has been awarded to Josias Booker, Esq., being the premium offered for the most successful attempt to apply machinery worked by cattle in aid of the labour of slaves in our American colonies. The object of the Society, in offering this premium, was to induce the planters to make trial of agricultural and other simple machines adapted to their circumstances; and thus to convince themselves experimentally, that of all the modes of performing common agricultural operations, and bringing the rough produce into a marketable state, the labour of slaves is by far the most expensive and unprofitable: a farther object was to mitigate the situation of the slave by transferring the severest labour to cattle and machinery.

Mr. Booker's communication, in claim of the premium, is a simple and very interesting detail of the gradual adoption by him of cattle labour and simple machinery, in aid of negroes, in cultivating a cotton plantation at Demerara, and preparing the produce for exportation. On many kinds of work, the saving of expense amounted to no less than fifty per cent; and as this took place chiefly in the most laborious departments, namely, by the substitution of the plough for the hoe, and in working by cattle the machine for ginning the cotton, the situation of the negroes was proportionally amended, not only by diminishing the sum total of labour to be performed, but by making that diminution to fall chiefly on the most oppressive forms of it. What is better still, Mr. Booker's wise humanity was not confined within the bounds of the estate committed to his management, but his neighbours had the discernment to see the advantage that he was deriving from it, and the good sense, in several instances, to follow his example. May the good seed that has thus been sown grow and prosper; and may the Society have the satisfaction of bestowing more medals for this object, and of recording the names of those whose enlightened good sense has demonstrated that the interest of the master is inseparably connected with the content and ease of his bondsmen!

The above are the subjects treated of in the present Volume: but the Committee feel that they shall scarcely have discharged their duty without some notice of the evening "Illustrations" which so agreeably occupied the time of the Society during part of the last Session. The plan, which originated with the Secretary, was to devote each evening to the description of some Art or Manufacture; in which historical notices should be combined with practical details, illustrated by drawings and specimens, so as to form a summary, at the same time entertaining and instructive, of the most important and curious of those arts which, by calling forth the skill and enterprise of the human race, have eminently contributed to the advance of civilisation and knowledge. The collection and arrangement of the materials was entrusted to the Secretary, with permission to apply, in the name of the Society, to individuals and public bodies for information or the loan of specimens. It is highly gratifying to find, that no application thus made was met by a denial; but, on the contrary, that the most liberal assistance has been given to carry into full effect the views of the Society. The subjects illustrated on the seven evenings devoted to this purpose last Session, were, Pottery and Porcelain, Glass, Gypsum and the art of Casting in Plaster, Stereotype Founding, and Paper. The success which attended this first experiment has induced the Society to make arrangements for continuing it on a somewhat enlarged scale in the present Session.

In the last Volume, p. 117, is inserted a short notice of a covered spoon for administering medicine, which is there represented as the invention of Mr. George Gibson. A letter has since been received from Dr. A. Todd Thomson, from which it appears, that covered spoons, with solid handles, for giving food or medicine to insane persons, have long ago been tried, but were abandoned, as not answering the intended purpose; that Dr. A. T. Thomson suggested to Mr. Gibson the idea of perforating the handle of the spoon; and that the latter, in the construction of the instrument, has added sundry adaptations, in order to secure a complete fitting of the cover to the bowl of the spoon.